QE
351
M35
v. 15
1961-62
N/C

MINERALOGICAL ABSTRACTS

VOLUME 15

(Nos. 1—8, 1961—1962)

Edited by

JAMES PHEMISTER and OLIVE BRADLEY

ORGANIZERS OF ABSTRACTS

Great Britain :
R. A. Howie,
King's College, Strand, London, W.C.2.

America :
L. G. Berry,
Queen's University, Kingston, Ontario.

Australia : J. MacAndrew,
University of Melbourne, Victoria.

Belgium : R. Van Tassel,
Institut Royal Sci. nat., Brussels.

Bulgaria : Iv. Kostov,
University of Sofia.

Czechoslovakia : Jiři Novák,
Charles University, Prague.

Denmark : H. Micheelsen,
Mineralogisk Museum, Copenhagen.

Egypt : E. M. El Shazly,
Geological Survey, Dawawin.

Finland : V. Marmo,
Geological Survey, Otaniemi.

Germany : Isa Kubach,
Frankfurt-am-Main.

India : A. P. Subramaniam,
Geological Survey, Delhi.

Israel : D. Yaalon,
The Hebrew University, Jerusalem.

Italy : Edoardo Sanero,
Università di Genova.

Japan : Ichiro Sunagawa,
Geological Survey, Kawasaki-Shi.

Netherlands : P. C. Zwaan,
Rijksmuseum Geol. Min., Leiden.

New Zealand : W. A. Watters,
Geological Survey, North Island.

Norway : Ivar W. Oftedal,
Institutt for Geologi, Oslo.

Pakistan : F. A. Shams,
University of the Punjab, Lahore.

South Africa : E. S. W. Simpson,
University of Capetown, Rondebosch.

Spain : M. Font-Altaba,
The University, Barcelona.

Sweden : Sven Hjelmqvist,
Lund University.

Switzerland : Max Weibel,
Eidg. Techn. Hochschule, Zürich.

PUBLISHED JOINTLY BY
THE MINERALOGICAL SOCIETY OF GREAT BRITAIN AND THE MINERALOGICAL SOCIETY OF AMERICA
LONDON—1963

CONTENTS

The fifteenth volume of MINERALOGICAL ABSTRACTS contains 4,754 abstracts and citations of papers, and notices of 9 bibliographies, 87 books, and 2 new Russian journals. The abstracts are grouped under the seventeen headings :—

AGE DETERMINATION AND ISOTOPE MINERALOGY (pp. 1, 73, 169, 245, 321, 397, 493).

APPARATUS AND TECHNIQUES (pp. 5, 76, 170, 246, 322, 400, 496).

BIBLIOGRAPHIES AND BOOK NOTICES (pp. 13, 85, 177, 252, 328, 408, 503).

CLAY MINERALS (pp. 14, 87, 179, 254, 329, 410, 505).

CRYSTAL STRUCTURE, INCLUDING MORPHOLOGY (pp. 18, 94, 182, 258, 334, 415, 511).

ECONOMIC MINERALS AND ORE DEPOSITS (pp. 22, 101, 186, 267, 338, 423, 515).

EXPERIMENTAL MINERALOGY (pp. 28, 113, 200, 274, 347, 436, 522).

GEMSTONES (pp. 33, 121, 203, 278, 442, 529).

GEOCHEMISTRY (pp. 34, 122, 204, 279, 349, 443, 530).

HISTORY AND BIOGRAPHY (pp. 37, 128, 206, 284, 350).

METEORITES AND TEKTITES (pp. 37, 128, 285, 351, 447, 534).

MINERAL DATA (pp. 40, 130, 207, 287, 352, 451, 537).

NEW MINERALS (pp. 43, 134, 211, 290, 357, 459, 541).

PHYSICAL PROPERTIES OF MINERALS AND ROCKS (pp. 45, 136, 213, 294, 366, 461, 543).

ROCK-FORMING MINERALS AND PETROLOGY (pp. 49, 139, 216, 297, 367, 464, 547).

TOPOGRAPHICAL MINERALOGY (pp. 65, 163, 237, 318, 391, 485, 565).

VARIOUS TOPICS (pp. 69, 167, 239, 319, 395, 490, 567).

Some of the more lengthy sections are subdivided ; for example, Rock-forming minerals and petrology has been broken down into Rock-forming minerals ; Petrology, general ; Petrography, regional ; Petrology, structural ; Petrogenesis ; Volcanology ; Metamorphism ; Sedimentary petrology ; and minor subdivisions where suitable, though all subdivisions may not have been used in any one number. Within sections attempt has been made at some appropriate grouping, for example in Petrology, regional, according to geography ; in Mineral data according to Dana's classification ; in Physical properties according to the subject, and so on.

The Index to volume 15 which constitutes No. 8, December 1962, is in two parts : an Author Index (pp. 569–615) and a Subject Index (pp. 617–669) which includes topographical references. Place-names are, in general, in the form used by the Columbia-Lippincote Gazetteer of the World (1952) ; alternative forms are given on occasion. Geographical abbreviations used are : Co. County ; Is. Island, Islands ; L. Lake, Loch (Scotland), Lough (Ireland) ; Mt(s). Mountain(s) ; R. River.

The Index has been prepared by Dr. O. Bradley. Grateful thanks are offered to the ladies and gentlemen who have obliged us by notices of errors in Vol. 15 and in preceding volumes of MINERALOGICAL ABSTRACTS.

ABSTRACTORS

Contributors of abstracts to *Mineralogical Abstracts*, vol. 15, are :—

ABBOTT, D., *Gt. Britain* ; AITKEN, W. W., *Gt. Britain* ; ALBEE, A. L., *U.S.A.* ; ANDREWS, G. A., *Gt. Britain* ; BATTEY, M. H., *Gt. Britain* ; BERRY, L. G., *Canada* ; BIELER, B. H., *U.S.A.* ; BLACK, G. P., *Gt. Britain* ; BOSSI, G. E., *Argentina* ; BOWN, M. G., *Gt. Britain* ; BOYD, F. R., *U.S.A.* ; BRADLEY, O., *Gt. Britain* ; BROWN, G. M., *Gt. Britain* ; BRYANT, B., *U.S.A.* ; BRYHNI, I., *Norway* ; BUCHANAN, R. M., *Canada* ; BUTLER, B. C. M., *Gt. Britain* ; CAMPBELL, F. A., *Canada* ; CARROLL, D., *U.S.A.* ; CHINNOR, G. A., *Gt. Britain* ; CLARK, A. H., *Gt. Britain* ; COCKBAIN, A. G., *Gt. Britain* ; CROASDALE, R., *Gt. Britain* ; DARNLEY, A. G., *Gt. Britain* ; DEARNLEY, R., *Gt. Britain* ; DENAEYER, M.-E., *Belgium* ; EL SHAZLY, E. M., *Egypt* ; EVANS, B. W., *Gt. Britain* ;

FREIBERG, BERGAKADEMIE, *Germany* ; FERGUSON, R. B., *Canada* ; FICHTBAUER, H., *Germany* ; HALE, W. E., *Canada* ; HÄRME, M., *Finland* ; HARTLEY, J., *Gt. Britain* ; HAYNES, J. M., *Gt. Britain* ; HEIER, K. S., *Norway* ; HOLLER, A. C., *U.S.A.* ; HOLSER, W. T., *U.S.A.* ; HOMER, P. N., *Gt. Britain* ; HOPPE, G., *Germany* ; HOWIE, R. A., *Gt. Britain* ; HYTÖNEN, K., *Finland* ; GABRIELSON, O., *Sweden* ; GRÜNENFELDER, M., *Switzerland* ; JAPAN, MIN. SOC. OF, *Japan* ; JÉRÉMINE, E., *France* ; KELSEY, C. H., *Gt. Britain* ; KONTA, J., *Czechoslovakia* ; KOSTOV, IV., *Bulgaria* ; KÜHN, R., *Germany* ; LAMBERT, R. STJ., *Gt. Britain* ; LAWSON, D. E., *Canada* ; LEBAS, M. J., *Gt. Britain* ; LEPP, H., *U.S.A.* ;

MACKENZIE, R. C., *Gt. Britain* ; MACKENZIE, W. S., *Gt. Britain* ; MCKIE, D., *Gt. Britain* ; MALDE, H. E., *U.S.A.* ; MARMO, V., *Finland* ; MATHIAS, M., *S. Africa* ; MAXWELL, J. A., *Canada* ; MÉLON, J., *Belgium* ; MICHEELSEN, H., *Denmark* ; MITCHELL, R. .S, *U.S.A.* ; MODDLE, D. A., *Canada* ; NICHOLLS, G. D., *Gt. Britain* ; NOVÁK, J., *Czechoslovakia* ; OFTEDAL, I. W., *Norway* ; OPPENHEIM, M. J., *Israel* ; OVERWEEL, C. J., *Netherlands* ; PABST, A., *U.S.A.* ; PARHAM, W. E., *U.S.A.* ; PARNAMAA, E., *Sweden* ; PERRAULT, G., *Canada* ; PHEMISTER, J., *Gt. Britain* ; PRESTON, J., *Gt. Britain* ; PULFREY, W., *Kenya* ; RAO, A. B., *Brazil* ; RAST, N., *Gt. Britain* ; ROBERTSON, F. S., *U.S.A.* ; RYBACK, G., *Gt. Britain* ;

SABINE, P. A., *Gt. Britain* ; SANDRÉA, A., *France* ; SANERO, E., *Italy* ; SCHELLINCK, F., *Belgium* ; SERVOS, K., *U.S.A.* ; SIEGEL, F. R., *Argentina* ; SIMPSON, E. S. W., *S. Africa* ; SÍPEK, V., *Czechoslovakia* ; SKIBA, W., *Gt. Britain* ; SOLES, J. A., *Canada* ; SOUSA, M. S., *Brazil* ; STRUNZ, H., *Germany* ; SUBRAMANIAM, A. P., *India* ; SUNAGAWA, I., *Japan* ; TOMKEIEFF, S. I., *Gt. Britain* ; TRAILL, R. J., *Canada* ; TUČEK, K., *Czechoslovakia* ; VAN TASSEL, R., *Belgium* ; WATTERS, W. A., *New Zealand* ; WAYLAND, R. G., *U.S.A.* ; WEIBEL, M., *Switzerland* ; WELIN, E., *Sweden* ; WELLS, R. G., *U.S.A.* ; WHITE, W. A., *U.S.A.* ; WILBAND, J. T., *Canada* ; WILCOX, R. E., *U.S.A.* ; WINCHELL, H., *U.S.A.* ; YAALON, D. H., *Israel* ; YOUNG, B. H., *Gt. Britain* ; ZUSSMAN, J., *Gt. Britain* ; ZWAAN, P. C., *Netherlands*.

ERRATA AND ADDENDA

(L, M, R indicate left, middle, right column ;
* indicates counted from the bottom.)

Mineralogical Abstracts, vol. 2.

AGE	LINE	
02R	(Index)	*Under* Chloritoid, *for* 432 read 422

Mineralogical Abstracts, vol. 3.

48R	(Index)	*Under* Ptilolite, *delete* 545

Mineralogical Abstracts, vol. 4.

03	1*	*For* S *read* Si
57	4*	*For* $(O,OH,F)_{12}$ *read* $(O,OH,F)_{76}$

Mineralogical Abstracts, vol. 5.

74	2*	*For* 0·996Å *read* 9·96Å
31	11, 12–13	*Delete entry for* Rutland mine
19R	(Index)	*Under* Strontium-anorthite, *for* 192 *read* 102

Mineralogical Abstracts, vol. 6.

23	15	*For* by M. Dalloni *read* dirigée par M. Dalloni
73	13*	*For* hygropilite *read* hygrophilite
38R	(Index)	
25R	(Index),29	*Under* Stilpnochlormethane, *for* ; *read* .
25	—, 30	*Insert* Stilpnomelane *before New Zealand*, anal., 225

Mineralogical Abstracts, vol. 7.

01	10*	*For* $(OH)_3$ *read* $(OH)_8$
84	18	*For* O_{11} *read* O_{10}

Mineralogical Abstracts, vol. 11.

18	24*(Index)	*For* Landgren *read* Landergren

Mineralogical Abstracts, vol. 12.

84	11	*For* Valkenberg *read* Valkenburg
71	10*	*For* TiO_2 0·06 *read* TiO_2 0·08
10	7	*For* vol. 39, 1 col. pl. *read* vol. 39, pp. 630–635, 1 col. pl.
60	2	*For* 17 *read* 178

Mineralogical Abstracts, vol. 13.

14	1	*For* pace *read* space
30	8	*For* brischen *read* broischen
04	1*	*For* Edington *read* Edgington
94	20	*For* vol. 55 *read* vol. 50
06	6*&1*	*For* zircon *read* zirconia
—	3*&2*	*For* monoclinic zircon *read* baddeleyite
33	16	*For* 'cristallographic' *read* 'crystallographic'

Mineralogical Abstracts, vol. 14.

o. 8, ivL	34	*Delete* 292R 3* For *Fagnes read Fanges*
35L	4*	*For* **Wakanabe** *read* **Watanabe**
24L	8	*For* peutêtre *read* peut-être
18R	18*	*For* Sinka (B. C.) *read* Sinha (B. C.)
15L	22	*For* Muto (Tadashi) *read* Muto (Tadashi), Meyrowitz (Robert), Pommer (Alfred M), & Murano (Toru)
49M	5	For *Ykutiaa* read *Yakutia*
54R	14	*For* Gonimeter *read* Goniometer
30R	14–15	*Under* Meyrowitz (R.) *insert* — *v.* Muto (T.), 415
32R	30*–31*	*Add* Murano (T.) *v.* Muto (T.), 415
38R	2–3	*Add under* Pommer (A.) — *v.* Muto (T.), 415
99R	40	*For* CaO–CO_3 *read* CaO–CO_2
05M	31*	*Delete* Wakanabe (T.) & Kato (A.), Pyrosmalite, *Japan*, 135
05R	42/43	*Add* — & Kato (A.), Pyrosmalite, *Japan*, 135

Mineralogical Abstracts, vol. 15.

PAGE	LINE	
9R	22	*For* Frölich *read* Fröhlich
10L	4*	*For* Smyshlaev *read* Smyshlaev
18L	7*	For *Sructural* read *Structural*
20R	19*	*For* C/m *read* cm^{-1}
25R	18	*For* Phillipines *read* Philippines
41L	1	*For* Caillière *read* Caillère
43L	14	For *Chichbu* read *Chichibu*
44R	2	*For* Nagazaki *read* Nagasaki
—	11*	*For* γ 1·506 *read* γ 1·566
47R	13*	*For* Bohun (J.) *read* Bohun (A.)
57L	20	*Add* 1957 *before* sect. C
58R	5*	*For* vary *read* varies
66R	14	For *Vismuth* read *Vismut*
—	4*	For *Priorite* read *Priorit ;* for *Třepíče* read *Třebíče*
67L	7	For *naleziětě* read *naleziště*
—	14	*For* Zbirch *read* Zbiroh
—	11*	*For* Utur *read* Utín
—	7*	*For* Křemiže *read* Křemže
67R	16	*For* Nový Kuín *read* Nový Knín
68L	18*	*For* amaller *read* smaller
83R	5	*For* minera *read* mineral
85L	9*	*For* Nalivikin *read* Nalivkin
93R	12*	*For* Roy (Rustom) *read* Roy (Rustum)
101R	12	*For* Czamanske (C. K.) *read* Czamanske (G. K.)
102L	25*	*Add* Förh. *after* Fören.
112L	20	For *minérais* read *minerais*
—	4*	For *Dirvik* read *Divrik*
112R	1	
125R	17*	*For* [M.A. **14**–44] *read* [M.A. **14**–44, 160]
126R	10*	For *hydrochemical* read *hydrogeochemical*
129L	16–18	For Anderson (E. C.). *Spectrometric . . . in meteorites* read Turkevich (A.). *Determinations of concentrations of heavy elements in meteorites by activation analysis*
130L	22	*For* [M.A. **34**–133] *read* [M.A. **14**–133]
130R	4*	*For* Rao (Bhaskar A.) *read* Rao (A. Bhaskara)
—	1*	*Add* do Norte *after* Rio Grande
131L	25	*For* Wittle *read* Whittle
131R	4*	*For* Rao (Bhaskara A.) *read* Rao (A. Bhaskara)
133L	22	*For* 547–562 *read* 547–561
133R	2*	For *occurences* read *occurrences*
135L	9*	*For* $2V_\gamma$ 60° *read* $2V_\alpha$ 60°
135R	13*	*For* Kemb *read* Kamb
144L	17*	For *Noril* read *Noril'sk*
144R	25*	*For* Chakrabarty *read* Chakraborty
154R	25	*For* Subramanian *read* Subramaniam
155L	10	For *sillinanite* read *sillimanite*
159L	13*	For *Cenzoic* read *Cenozoic*
168R	8*	For *Doubrovka* read *Dubrovka*
171R	13	*For* Warr (Jessie J.) *read* Warr (Jesse J.)
174L	12*,8*,4*	
177L	19	For *Foscher-Tropsch* read *Fischer-Tropsch*
184R	17	For *macgovernite* read *mcgovernite*
185L	6	*For* Marinello *read* Marinelli
189R	12	*For* Siegfried (M.) *read* Muessig (Siegfried)
193R	17	*For* Peterson *read* Petersen
207L	1	*For* Leelanda *read* Leelananda
207R	2	
211R	12*	*For* Abelado *read* Abeledo
—	7*	*For c* 14·48Å *read c* 18·48Å
213L	11	For *Moh's* read *Mohs'*
219R	12*	*For* peridotite *read* Peridotite
—	11*	*Add* **14**–460, *after* **7**–185,
—	8*	*For* 80 mol % *read* 80 and 90 mol %

Mineralogical Abstracts, vol. 15 (*contd.*).

PAGE	LINE	
225L	4*	*For* SENGUPTA *read* SEN GUPTA
233R	20	For *a sphérolithes* read *à sphérolithes*
238R	19*	*For* octohedron *read* octahedron
240R	12	*For* kuckersite *read* kukersite
247R	8*	*Add* Ge, *after* Ga,
259R	11	For *or* read *of*
261L	8*	*For* 1960 *read* 1961
264L	13	*For* **12**–38 *read* **12**–98
270L	12	*For* Kersarge *read* Kearsarge
274R	9	*For* γ–α 0·30 *read* γ–α 0·030
280L	7*	For *ourmalines* read *tourmalines*
290L	14	*For* claudeite *read* claudetite
290R	5	*For* p. xxx *read* p. 292
—	19	*For* (C_2O_4,AsO_4,SiO_4) *read* (Cr_2O_4,AsO_4,SiO_4)
—	21	For *chromifere* read *chromifère*
292R	1*	*For* Kutná Gora *read* Kutná Hora
293L	22	For *uraanmineral* read *uraanmineraal*
304R	16	*For* Guerat *read* Gueret
—	20*	For *fraidronite* read *fraidornite*
—	17*	*For* fraidonite *read* fraidornite
308L	22*	*For* MURTHY (NARASIMHA C.) *read* MURTHY (C. NARASIMHA)
312R	24, 27	*For* ultramafic *read* Ultramafic
—	28	*For* peridotite *read* Peridotite
—	30	*For* bronzitite *read* Bronzitite
320L	6–7	For *concretions* read *concrétions*
321L	9	*For* plagioclase *read* plagioclases
329R	5	*For* RILEY (CHARLES M.) *read* GLEASON (STERLING)
—	8	*Add* Erratum A.M. **46**-459
336R	2	For *Lezenbach* read *Lengenbach*

Mineralogical Abstracts, vol. 15 (*contd.*).

PAGE	LINE	
339L	15*	*For* 7 pp. *read* **2**, 513–523
355L	13*	*For* Banskó Beló *read* Banská Belá
361L	1*	*For* ramseyite *read* ramsayite
361R	11	*For* English geologist G. W. Tyrrell *r* Canadian geologist J. B. Tyrrell
363L	12*	*For* BONSHEDT-KUPLETSKAYA *read* BONSHTE KUPLETSKAYA
376L	14	*For* Parvel *read* Parwel
377R	19	*For* DIMITIEV *read* DIMITRIEV
408R	17	*For* **33** (June, 1962) *read* **33**–73
410R	3*	*For* 229–331 *read* 229–231
412R	19*	*For* analysis *read* analyses
421R	9	*For* ABO_3 *read* ABO_3
425L	6*	*For* $10^{-}/^{6}$ *read* 10^{-36}
429L	16*, 6*	For *galenite* read *galena*
451R	6	*For* p. 399 *read* p. 400
456L	18	*For* Keikkinen *read* Heikkinen
458R	7*	*For* =100·36 *read* ='100·36'
460L	8*	*Add* , =99·99 *after* Cl 0·28
469L	20*	*Delete* H_2O- 0·10
474R	6*	*For* rhyolitc *read* rhyolite
476L	18	*Add* comma *before* a value
480L	14	*Add* [amber] *after* succinite
485L	10*	*For* M.M. **32**–33 *read* M.A. **13**–33
486R	4	*For* GADZHEHEVA *read* GADZHEVA
—	17	*Add* [M.A. **12**–12]
494R	16*	*For* PICCIOTO *read* PICCIOTTO
498R	11*	*For* MERRIL *read* MERRILL
513R	4*	*For* betechtinite *read* betekhtinite
539L	10*	*For* Kasakova *read* Kazakova
554R	13	*For* Vavato *read* Vavavato

ABBREVIATIONS USED IN REFERENCE TO PUBLICATIONS

Abhdl.	Abhandlungen
Abstr.	Abstract,-s
Abt.	Abteilung
Acad., Accad., Akad.	Academy, & *equiv.*
Adv.	Advancement
Agric.	Agricultur-al, -e
Anal.	Analy-st,-tical, &c.
Ann., An.	Annals, Anales, & *equiv.*
Anorg.	Anorganisch
Appl.	Applied
Arch.	Archives
Asoc., Assoc.	Association, & *equiv.*
Astron.	Astronomical
Bd.	Band
Beitr.	Beiträge
Ber.	Bericht-e
Berg.	Bergwesen
Bol., Boll., Bull.	Bulletin, & *equiv.*
Bur.	Bureau
Ceram.	Ceramic, & *equiv.*
Chem., Chim.	Chemi-cal,-stry, & *equiv.*
Cien.	Ciencia,-s
Circ.	Circular
Cl.	Classe
Com.	Comisión
Comm.	Commission
Conf.	Conference, & *equiv.*
Congr.	Congress, & *equiv.*
Contr.	Contributions
C.R.	Comptes Rendus
Crist., Cryst.	Crystallograph-ical,-y, & *equiv.*
Dept.	Department, & *equiv.*
Diss.	Dissertation
Divn.	Division
Dokl.	Doklady=C.R.
Econ.	Economic
Educ.	Education
Eng.	Engineering
Exped.	Expedition
Exper.	Experimental
Expl.	Exploration
Fac.	Faculty
Fis.	Fisicale, fisico
Fören.	Föreningen
Förh.	Förhandlinger
Fortsch.	Fortschritt,-e
Gen.	General
Geol., géol.	Geolog-y, -ical, -ist, & *equiv.*
Gesell.	Gesellschaft
Geo-chem., -chim.	Geochemi-cal, -stry, &c.
Geophys.	Geophysic-al, -s
Govt.	Government
Hdbh.	Handbuch
Illustr.	Illustrat-ed,-ions
Imp.	Imperial
Industr.	Industr-ial, -y
Inst.	Institute, institution, & *equiv.*
Instr.	Instruments
Int.	Interior
Intern.	International
Invest.	Investigations
Issl.	Issledovaniye=investigation
Ist.	Istituto
Izd.	Izdanie=publication
Izvest.	Izvestiya
Jahresb.	Jahresbericht
Jahrb.	Jahrbuch
Jorn., Journ.	Journal, & *equiv.*
Khim.	Khim-ie, &c.
Kl.	Klasse
Krist.	Kristallographie, &c.
Lab.	Laboratory
Lit.	Literary
Mag.	Magazine
Mat., Math.	Mathematical, & *equiv.*
Medd.	Meddelelser
Mem., Mém.	Memoir, -s, & *equiv.*
Metall.	Metallurg-ical, -y
Min.	Mineralog-ical, -ist, -y
Misc.	Miscellaneous
Mitt.	Mitteilungen
Mus., Muz.	Museum, & *equiv.*
Nac., Nat., Naz.	National, & *equiv.*
Natur.	Natur-al, -alist, & *equiv.*
Natur-w, -v.	Naturwissenschaft, & *equiv.*
Obraz.	Obrazovanie=education
Obshch.	Obshchestva=society
Petr.	Petrolog-ical, -y, & *equiv.*
Petrol.	Petroleum
Phil.	Philosophical, &c.
Phys.	Physic-al, -s, & *equiv.*
Polytech.	Polytechnic, & *equiv.*
Pract., Prakt.	Practical, & *equiv.*
Proc.	Proceedings
Publ.	Publication(s), published
Rasv.	Razvedka=survey
Rec.	Records
Ref.	References, referata
Rend.	Rendiconti
Rept.	Report(s)
Res.	Research
Reserv.	Reserves
Resrcs.	Resources
Roy.	Royal, & *equiv.*
Rdsch.	Rundschau
Sborn.	Sbornik=magazine
Sch.	School, Schule
Sci.	Science
Sect.	Section
Sedim.	Sedimentary ,
Ser., sér.	Series, & *equiv.*
Serv.	Service
Sitzb.	Sitzungsbericht
Skr.	Skrift, -en, -er
Soc.	Society, & *equiv.*
Sondbd.	Sonderband
Spec., spez.	Special, & *equiv.*
Stand.	Standard(s)
Stn.	Station
Surv.	Survey, -or
Symp.	Symposium
Tab.	Tables, tabellen
Techn.	Technolog-ical, -y
Tids(s)kr.	Tids(s)krift, -en
Tijdschr.	Tijdschrift
Trab.	Trabajos
Trans.	Transactions
Transl.	Translat-ed, -ion
Uch.	Uchennye=learned
Ucheb.	Uchebnyi=teaching
Unders.	Undersogelse, undersokning
Univ.	University, & *equiv.*
Verhdl.	Verhandlungen
Vidensk.	Videnskaps
Volc., Vulk.	Volcanolog-ical, -y, &c.
Vses.	Vsesoyuznyi=All-Union
Vyssh.	Vysshikh=higher
Wiss.	Wissenschaft
Zap.	Zapiski=memoirs
Zav.	Zavodskaya=factory
Zaved.	Zavedenii=institution
Zeits.	Zeitschrift
Zhurn.	Zhurnal=journal
Ztg.	Zeitung

ABBREVIATIONS AND SYMBOLS

used in the text of abstracts

M.M. .. Mineralogical Magazine : M.A. .. Mineralogical Abstracts : A.M. .. American Mineralogist

CHEMICAL & PHYSICAL-CHEMICAL

cation-exchange-capacity	c.e.c.
differential thermal analysis	d.t.a.
equivalent U_3O_8	eU_3O_8
ethylenediaminetetra-acetic acid	EDTA
heat of formation (absolute temperature subscript)	ΔH_t
ionic potential, e.g.	pH
insoluble residue	insol. res.
isotopes, e.g.	^{40}Ar, ^{40}K
loss on ignition	ign. loss
milliequivalent	me.
microgramme	μg
million-years	m.y.
not determined	n.d.
not found	nt. fd.
not present	nil
parts per million	p.p.m.
strength of solution, normal	*N*
— — — molar	*M*
substances in ionic state	
anions, e.g.	Cl^-, SO_4^{2-}
cations, e.g.	K^+, Fe^{3+}
valency, e.g.	Cl^{I}, Fe^{II}, Fe^{III}

CRYSTALLOGRAPHIC & STRUCTURAL

Ångstrom unit (10^{-8} cm)	Å
crystal axes	*a*, *b*, *c*
— face indices	(hkl)
— form indices	{hkl}
— zone indices	[hkl]
indices of X-ray diffractions	hkl
intensity,	*I*
— relative	I/I_0
interplanar spacing	*d*
mica structural polymorphs	$1M_1$, $2M_1$
Siegbahn units	kX
space group. These words will be written in full	
unit cell, formula units	*Z*
— — repeat distances	*a*, *b*, *c*
— — reciprocal lattice lengths of edges	a^*, b^*, c^*
— — interaxial angles direct lattice	α, β, γ
— — — — reciprocal lattice	α^*, β^*, γ^*

OPTICAL

dispersion, e.g.	$r > v$
extinction angle, e.g.	$\gamma : c$
optic axial angle	2V
— — plane	O.A.P.
refractive index, in text	refr. ind.
— — of isotropic mineral	*n*
refractive indices	
of uniaxial mineral	ω, ϵ
of biaxial mineral	α, β, γ
sign of biaxiality	
negative	$-$ or $2V_\alpha$
positive	$+$ or $2V_\gamma$

PHYSICAL (*other*)

calorie	cal.
calorie, large	kcal.
cycles per second	c/s
degree centigrade	°C
density	*D* (quote units)
— , relative, e.g.	D_4^{20}
gramme	g
hardness	H.
melting-point	m.p.
micron (10^{-4} cm)	μ
millimicron (10^{-7} cm)	mμ
pounds per square inch	lb/in^2
soluble	sol.
specific gravity, terms of reference not known	sp. gr.
wavelength	λ

SYMBOLS

approximately equal to	$\approx$
equal to	$=$
not equal to	$\neq$
equal to or greater than	$\geqslant$
equal to or less than	$\leqslant$
greater than	$>$
not greater than	$\ngtr$
less than	$<$
not less than	$\nless$
parallel to	$\parallel$
per cent.	%
per mille, per mil.	‰
perpendicular to	$\perp$
proportional to	$\propto$